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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,651	11/19/2003	Nidal A. Ghizawi	H0006508	7664

7590 06/30/2006

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EXAMINER	
VERDIER, CHRISTOPHER M	
ART UNIT	PAPER NUMBER
3745	

DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/716,651	GHIZAWI, NIDAL A.	
	Examiner	Art Unit	
	Christopher Verdier	3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12-16-05, 4-11-06*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,6-8,11-15 and 22-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1,2,6 and 7* is/are allowed.

6)☒ Claim(s) *8,11-15 and 22-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11-19-03, 12-16-05* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Applicant's amendments dated December 16, 2005 and April 11, 2006 have been carefully considered but are non-persuasive. Claims 1-2, 6-8, 11-15, and 22-27 are pending. The affirmation of the election of species dated April 11, 2006 has been provided and is appreciated. The replacement sheet of drawings for figure 9 is accepted by the examiner. The claims have been amended so that the objections to the drawings are overcome. Applicant has amended the specification on page 6, line 3 to overcome the informality thereat, and has amended claim 11 to adopt the suggested claim language. Correction of these matters is noted with appreciation.

With regard to Applicant's argument that claim 8 has not been amended to add the word "the" before "blade" in line 3, because this is the first occurrence of the word "blades" in the claim, please note that the previous Office action suggested that this change be made to claim 8, line 5, not line 3. Claim 8 has been amended and the same change is suggested; in amended claim 8, line 4, -- the -- may be inserted after "of". With regard to Applicant's argument that an additional "Brief Summary of the Invention" has not been added to the specification, because the specification does provide a brief summary and an additional section that is formally titled as a brief summary is not required, this argument is not persuasive. See MPEP 608.01(a) and MPEP 608.01(d).

Applicant's argument that amended independent claim 1 defines over Japanese Patent Application Publication 11-190,201, McMahan 2,392,858, and Nagaoka 5,595,473 has been carefully considered and is persuasive. With regard to Applicant's argument pertaining to

amended claim 8 that Japanese Patent Application Publication 11-190,201 does not teach adjustable vanes, prior art figure 7 thereof teaches adjustable vanes c. However, it appears that these adjustable vanes are not provided in the embodiment of figures 1-5 that were relied upon. Applicant's arguments, see page 9, last paragraph, filed December 16, 2005, with respect to the rejection of claim 10 under 35 USC 102(b) as being anticipated by Japanese Patent Application Publication 11-190,201 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the teachings of Weigel 5,342,168. With regard to Applicant's argument that none of the references teach or suggest the claimed combination of adjustable blades disposed radially outward from nonlinear edges of the blades of a rotor so that the blades are subjected to cyclically varying aerodynamic forces as the blades pass in proximity to the vanes during rotation of the rotor, thereby cyclically stressing the blades, the examiner respectfully disagrees. Weigel teaches that a diffuser of a compressor may have variable geometry blades for converting kinetic energy into pressure energy. Such a compressor feature is conventional and it would be obvious to apply this feature to a compressor rotor having nonlinear edges at the blades of the rotor.

Information Disclosure Statement

The English abstract of Japanese Patent Application Publication 11-190,201 provided by Applicant in the Information Disclosure Statement (IDS) of December 16, 2005 has been considered by the examiner. However, since this reference is already listed by Applicant on the IDS of September 9, 2005, it has been crossed off.

Specification

The disclosure is objected to because of the following informalities: Appropriate correction is required.

There is no brief summary of the invention.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claims 22 and 25, which recite that the profile is continuous, have no antecedent basis in the specification.

Claims 23 and 26, which recite that the profile extends continuously from a first end to a second end in a generally axial direction, with the first and second ends extending radially to a greater extent than a midpoint of the profile between the first and second ends, have no antecedent basis in the specification.

Examiner's Suggestions to Claim Language

The following are suggestions to improve the clarity and precision of the claims:

In claim 8, line 4, -- the -- may be inserted after "of".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 13 and 22-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 13, line 2, "radial-axial projection" is a double recitation of the radial-axial projection in claim 8. In claim 22, line 2, "concave profile in radial-axial projection" is a double recitation of the concave profile in radial-axial projection in claim 1. In claim 23, line 2, "a concave profile in radial-axial projection" is a double recitation of the concave profile in radial-axial projection in claim 1. In claim 24, line 2, "radial-axial projection" is a double recitation of the radial-axial projection in claim 1. In claim 25, line 2, "radial-axial projection" is a double recitation of the radial-axial projection in claim 8. In claim 26, line 2, "radial-axial projection" is a double recitation of the radial-axial projection in claim 8. In claim 27, line 2, "radial-axial projection" is a double recitation of the radial-axial projection in claim 8.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 8, 11, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent Application Publication 11-190,201 in view of Leicht 4,702,672. Japanese Patent Application Publication 11-190,201 (figures 1-5) discloses a rotary apparatus configured to circulate a gas, the apparatus comprising a housing 1 defining an inlet 4 and an outlet 5, a rotor disposed in the housing and configured to rotate with a flow of gas through the housing, the rotor having a body portion 3 configured to rotate about an axis, and a plurality of blades 3a extending radially outward from the body portion, each blade defining an unnumbered first edge and a second edge 3b/3c, the first edge extending generally radially and the second edge extending generally axially, wherein the second edge of each blade is a leading edge of the blade and defines a nonlinear profile in radial-axial projection. The housing defines the inlet 4 radially outward from the rotor, the rotor being a turbine wheel connected to a shaft 2 and configured to be rotated by the circulation of the gas through the housing and rotate the shaft. All of the blades are inherently substantially similar.

However, Japanese Patent Application Publication 11-190,201 does not disclose a plurality of vanes disposed at circumferentially incremental locations in the housing radially outward from the second edge of the blades such that the blades are subject to cyclically varying aerodynamic forces as the blades pass in proximity to the vanes during rotation of the rotor, thereby cyclically stressing the blades, with the vanes being adjustable to control the flow of the gas through the housing (claim 8).

Leicht shows a turbine 1 having a plurality of vanes 7 disposed at circumferentially incremental locations in a housing 5 radially outward from a second edge of unnumbered blades of a rotor 18 such that the blades are subject to cyclically varying aerodynamic forces as the blades pass in proximity to the vanes during rotation of the rotor, thereby cyclically stressing the blades, with the vanes being adjustable to control the flow of the gas through the housing, for the purpose of adjusting output of the turbine.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the turbine of Japanese Patent Application Publication 11-190,201 with a plurality of vanes disposed at circumferentially incremental locations in the housing radially outward from the second edge of the blades such that the blades are subject to cyclically varying aerodynamic forces as the blades pass in proximity to the vanes during rotation of the rotor, thereby cyclically stressing the blades, with the vanes being adjustable to control the flow of the gas through the housing, as taught by Leicht, for the purpose of adjusting output of the turbine.

Claims 8, 12-15, and 25-26 (as far as claims 13 and 25-26 are definite and understood) are rejected under 35 U.S.C. 103(a) as being unpatentable over McMahan 2,392,858 in view of Weigel 5,342,168. McMahan discloses a rotary apparatus configured to circulate a gas, the apparatus comprising a housing (note that the rotor is used in a centrifugal compressor of superchargers for aircraft, which inherently have a housing defining an inlet and an outlet), a rotor in the form of a compressor wheel 2 disposed in the housing and configured to rotate with a

flow of gas through the housing, the rotor having a body portion 1 configured to rotate about an axis, and a plurality of blades 3 extending radially outward from the body portion, each blade defining a first edge 5 and a second edge 6, the first edge extending generally radially and the second edge extending generally axially, wherein the second edge of each blade is a trailing edge of the blade and defines a nonlinear profile in radial-axial projection. The compressor wheel is inherently connected to an unnumbered shaft near 1 and is configured to be rotated by the shaft to compress the gas in the housing and deliver the gas. The second edge of each blade defines a concave profile in radial-axial-projection, and the first edge defines a profile that extends axially and radially. All of the blades are inherently substantially similar. The second edge 6 of each blade defines a smooth and continuous concave profile in radial-axial projection, with the concave profile extending smoothly and continuously from a first end to a second end in a generally axial direction, the first and second ends extending radially to a greater extent than a midpoint of the profile between the first and second ends.

However, McMahan does not disclose a plurality of vanes disposed at circumferentially incremental locations in the housing radially outward from the second edge of the blades such that the blades are subject to cyclically varying aerodynamic forces as the blades pass in proximity to the vanes during rotation of the rotor, thereby cyclically stressing the blades, with the vanes being adjustable to control the flow of the gas through the housing (claim 8), and does not disclose that the housing defines a diffuser radially outward from the rotor, the gas being delivered through the outlet to the diffuser (claim 12).

Weigel shows a centrifugal compressor having a plurality of vanes 4 disposed at circumferentially incremental locations in a housing shown generally at 5 radially outward from a second edge of blades 3 such that the blades are subject to cyclically varying aerodynamic forces as the blades pass in proximity to the vanes during rotation of the rotor, thereby cyclically stressing the blades, with the vanes being adjustable to control the flow of the gas through the housing, and with the housing defining a diffuser 16 radially outward from the rotor, gas being delivered through the outlet to the diffuser, for the purpose of converting kinetic energy of the gas flow to static pressure, and allowing adaption to different volume flows to achieve under all operating conditions an optimal efficiency of the energy conversion.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the compressor of McMahan with a plurality of vanes disposed at circumferentially incremental locations in the housing radially outward from the second edge of the blades such that the blades are subject to cyclically varying aerodynamic forces as the blades pass in proximity to the vanes during rotation of the rotor, thereby cyclically stressing the blades, with the vanes being adjustable to control the flow of the gas through the housing, and to form the housing such that it defines a diffuser radially outward from the rotor, the gas being delivered through the outlet to the diffuser, as taught by Weigel, for the purpose of converting kinetic energy of the gas flow to static pressure, and allowing adaption to different volume flows to achieve under all operating conditions an optimal efficiency of the energy conversion.

Claims 8, 12-15, and 25 (as far as claims 13 and 25 are definite and understood) are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaoka 5,595,473 in view of Weigel 5,342,168. Nagaoka (figure 6) discloses a rotary apparatus configured to circulate a gas, the apparatus comprising a housing 1 defining an unnumbered inlet and an outlet near 6, a rotor in the form of a compressor wheel 3 disposed in the housing and configured to rotate with a flow of gas through the housing, the rotor having a body portion 3 configured to rotate about an axis, and a plurality of blades 5 extending radially outward from the body portion, each blade defining an unnumbered first edge and a second edge 7, the first edge extending generally radially and the second edge extending generally axially, wherein the second edge of each blade is a trailing edge of the blade and defines a nonlinear profile in radial-axial projection. The compressor wheel is connected to a shaft 2 and is configured to be rotated by the shaft to compress the gas in the housing and deliver the gas. The second edge of each blade defines a concave profile 7a, 7b in radial-axial-projection, and the first edge defines a profile that extends axially and radially. All of the blades are inherently substantially similar. The second edge of each blade defines a smooth and continuous concave profile in radial-axial projection. A plurality of vanes 6 is disposed at circumferentially incremental locations in the housing radially outward from the second edge of the blades such that the blades are subject to cyclically varying aerodynamic forces as the blades pass in proximity to the vanes during rotation of the rotor, thereby cyclically stressing the blades. The housing defines a diffuser radially outward from the rotor, the gas being delivered through the outlet to the diffuser.

However, Nagaoka does not discloses that the plurality of vanes 6 are adjustable to control the flow of the gas through the housing (claim 8).

Weigel shows a centrifugal compressor having a plurality of vanes 4 disposed at circumferentially incremental locations in a housing shown generally at 5 radially outward from a second edge of blades 3 such that the blades are subject to cyclically varying aerodynamic forces as the blades pass in proximity to the vanes during rotation of the rotor, thereby cyclically stressing the blades, with the vanes being adjustable to control the flow of the gas through the housing, and with the housing defining a diffuser 16 radially outward from the rotor, gas being delivered through the outlet to the diffuser, for the purpose of allowing adaption to different volume flows to achieve under all operating conditions an optimal efficiency of the energy conversion.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the compressor of Nagaoka such that the plurality of vanes are adjustable to control the flow of the gas through the housing, as taught by Weigel, for the purpose of allowing adaption to different volume flows to achieve under all operating conditions an optimal efficiency of the energy conversion.

Claims 8, 12-15, and 25-27 (as far as claims 13 and 25-27 are definite and understood) are rejected under 35 U.S.C. 103(a) as being unpatentable over German Patent 1,016,888 in view of Weigel 5,342,168. The German Patent (figures 1, 6, and 9) discloses a rotary apparatus

configured to circulate a gas, having a rotor 1, 1' in the form of a compressor wheel configured to rotate with a flow of gas, the rotor having a body portion near 1, 1' configured to rotate about an axis, and a plurality of blades 3, 3' extending radially outward from the body portion, each blade defining an unnumbered first edge and a second edge near 4, 5 (figure 1) and near 6 (figure 9), the first edge extending generally radially and the second edge extending generally axially, wherein the second edge of each blade is a trailing edge of the blade and defines a nonlinear profile in radial-axial projection. The compressor wheel is connected to an unnumbered shaft and is configured to be rotated by the shaft to compress the gas and deliver the gas. The second edge of each blade defines a concave profile in radial-axial-projection. The first edge of each blade defines a profile that extends axially and radially (figure 6). All of the blades are inherently substantially similar. The second edge of each blade defines a smooth and continuous concave profile in radial-axial projection, with the concave profile extending smoothly and continuously from a first end to a second end in a generally axial direction, the first and second ends extending radially to a greater extent than a midpoint of the profile between the first and second ends. The second edge of each blade defines in radial-axial projection two axial portions with a concave portion therebetween, the concave portion having a curvature that defines a center of curvature located radially outward of the second edge (figures 1 and 9).

However, the German Patent does not disclose a housing defining an inlet and an outlet, with a plurality of vanes disposed at circumferentially incremental locations in the housing radially outward from the second edge of the blades such that the blades are subject to cyclically varying aerodynamic forces as the blades pass in proximity to the vanes during rotation of the

rotor, thereby cyclically stressing the blades, with the vanes being adjustable to control the flow of the gas through the housing (claim 8), and does not disclose that the housing defines a diffuser radially outward from the rotor, the gas being delivered through the outlet to the diffuser (claim 12).

Weigel shows a centrifugal compressor having a housing shown generally at 5 having an inlet near 3 in figure 1 and an outlet near 8 in figure 1, and a plurality of vanes 4 disposed at circumferentially incremental locations in the housing radially outward from a second edge of blades 3 such that the blades are subject to cyclically varying aerodynamic forces as the blades pass in proximity to the vanes during rotation of the rotor, thereby cyclically stressing the blades, with the vanes being adjustable to control the flow of the gas through the housing, and with the housing defining a diffuser 16 radially outward from the rotor, gas being delivered through the outlet to the diffuser, for the purpose of converting kinetic energy of the gas flow to static pressure, and allowing adaption to different volume flows to achieve under all operating conditions an optimal efficiency of the energy conversion.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the compressor of the German Patent with a housing defining an inlet and an outlet and plurality of vanes disposed at circumferentially incremental locations in the housing radially outward from the second edge of the blades such that the blades are subject to cyclically varying aerodynamic forces as the blades pass in proximity to the vanes during rotation of the rotor, thereby cyclically stressing the blades, with the vanes being

adjustable to control the flow of the gas through the housing, and to form the housing such that it defines a diffuser radially outward from the rotor, the gas being delivered through the outlet to the diffuser, as taught by Weigel, for the purpose of converting kinetic energy of the gas flow to static pressure, and allowing adaption to different volume flows to achieve under all operating conditions an optimal efficiency of the energy conversion.

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lorett is cited to show a turbine or a compressor with variable stator vanes.

Allowable Subject Matter

Claims 1-2 and 6-7 are allowed.

Claims 22-24 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

C.V.
June 24, 2006

Christopher Verdier
Primary Examiner
Art Unit 3745